

RADIOLOGY CORNER

Elbow Synovial Fold Syndrome

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Note: This is the full text version of the radiology corner question published in the November 2007 issue, with the abbreviated answer in the December 2007 issue.

We present the case of a 17 year old female with elbow synovial fold syndrome (aka plica synovialis). The etiology is thought to be related to repetitive microtrauma resulting in thickening of normal elbow synovial folds. Associated symptoms typically worsen over time, particularly with increasing exercise and motion. While radiographs are unrevealing, MR imaging will show a thickened plica, oftentimes with secondary signs of plica impingement. The following report reviews presentation, pathophysiology, characteristic imaging findings and current treatment options for elbow synovial fold syndrome.

Introduction

Elbow synovial fold syndrome, also known as plica syndrome of the elbow or elbow plica synovialis, is a condition of the elbow which is common among athletes. It is thought to be caused from repeated impingement of redundant synovial folds. For the patient, this causes pain and a foreign body sensation of snapping or clicking. This type of syndrome has been well documented for the knee, but now is being recognized more often in the elbow [1,2]. We present the case of a 17 year old female with clinical and MR imaging evidence of this condition and provide a comprehensive review of the limited peer-reviewed literature.

History

A 17 year old female cheerleader reports experiencing acute left elbow pain while performing gymnastics maneuvers during recent practice sessions. The patient describes pain along the lateral aspect of the elbow and a sensation of "catching" during range of motion exercises. On physical examination, full extension of elbow was noted to cause worsening of pain and a very small joint effusion was suspected on palpation. Elbow radiography was initially obtained, followed subsequently by elbow MR imaging. At

the time of this case write-up, a conservative management approach had been introduced, to include rest and activity modification with a plan for the patient to follow up for further evaluation to include consideration of arthroscopic surgery, if symptoms recur.

Summary of Imaging Findings

There were no positive plain radiography findings; pertinent negatives included absence of loose bodies, significant joint effusion, or osteochondral defect. The workup of this condition often ceases here, with no further imaging. In this case, an MR imaging study was ordered to evaluate for suspected condylar injury. The MRI revealed a thickened posterolateral plica with a component interposed between the posterior capitellum and radial head (Fig. 1). Subchondral edema was present on both sides of the articulation (Fig. 2). The constellation of clinical symptoms and imaging findings are compatible with elbow synovial fold syndrome.

Discussion

Elbow synovial fold syndrome (in contradistinction to a similar process in the knee [1,2,3,4]), has been reported sparsely in peer-reviewed literature. This syndrome is common amongst athletes, particularly throwing athletes [1-9] and golfers [11]. Classic symptoms for elbow synovial fold syndrome include pain with repetitive motion, particularly flexion and extension movements. Affected patients commonly describe a feeling of "catching" or "snapping", with locking in extension also frequently reported. Swelling may or may not be present and pain is usually localized to the lateral aspect of the elbow. Often, patients have recurring symptoms over lengthy periods of time. Treatments including rest, nonsteroidal anti-inflammatory medications, and steroid injections may be attempted; however, conservative therapy may fail to adequately provide long-term symptomatic relief [1-8].

Anatomically, patients with synovial fold syndrome of the elbow have a thickened and inflamed synovial plica that falls between the capitellum and radial head. Impingement of this

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Fig. 1a. Sagittal Proton Density MR of the elbow shows a prominent triangular low to intermediate signal structure consistent with a mildly thickened synovial fold, interposed between the posterior articular surfaces of the radial head and capitellum.

plica is what causes pain and locking [2,3,5,7]. Simply stated, plicae are prominent folds of normal synovial membrane [1,4]. Normal synovial membranes are thin and pliable. With chronic synovitis, the membranes become thick and fibrotic. Histologic findings of excised plicae include chronic hypertrophic fibrous synovitis. Thickened plicae may be seen at MR imaging in both symptomatic and asymptomatic patients. In patients without this syndrome, additional findings of edema or inflammation are not present.

In the first reported cases of this syndrome, diagnosis was made by arthroscopy after the patient had failed all non-operative management [8]. The arthroscopic procedure revealed a thickened band of synovium extending from the radial head to the humerus that would become pinched or trapped in the radiocapitellar joint on extension of the elbow. Currently, the diagnosis is made by clinical and imaging findings.

Radiologic evaluation typically begins with plain film radiography which is often nonspecific or normal. Other modalities include CT arthrography, MRI, and MR arthrography, with the latter nearing 100% sensitivity for diagnosing plica syndrome, thus becoming the modality of choice. Common MR arthrographic findings include significantly thickened synovial fold (plica) extending from the posterior fat pad.



Fig. 1b, Sagittal Proton Density MR with arrows

The clinical differential diagnosis of plica syndrome includes lateral epicondylitis (aka tennis elbow), loose bodies, osteoarthritis, and snapping triceps tendon. Lateral epicondylitis appears to be the leading mis-diagnosis before proper imaging or arthroscopy is performed and the hypertrophied synovial band is discovered. Although this syndrome is often misdiagnosed, crepitus, snapping, and locking are uncommonly seen in epicondylitis [3,8]. MR arthrography allows exclusion of intra-articular loose bodies [1,6,9,10].

Currently, the leading theory as to why these anatomically present folds become hypertrophic and inflamed is repetitive microtrauma, which causes inflammation through cytokine mediated factors [2,4,5]. Pathologic reports point to chronic inflammation with an acute component superimposed. Often orthopedic surgeons will elect to arthroscopically remove enlarged synovial folds with the goal of eliminating symptoms and preventing future recurrence [1-9]. Surgical intervention is the definitive treatment of choice and the only known cure as studies have shown that a majority of patients' symptoms improve or even resolve with resection of the abnormal plicae [8].

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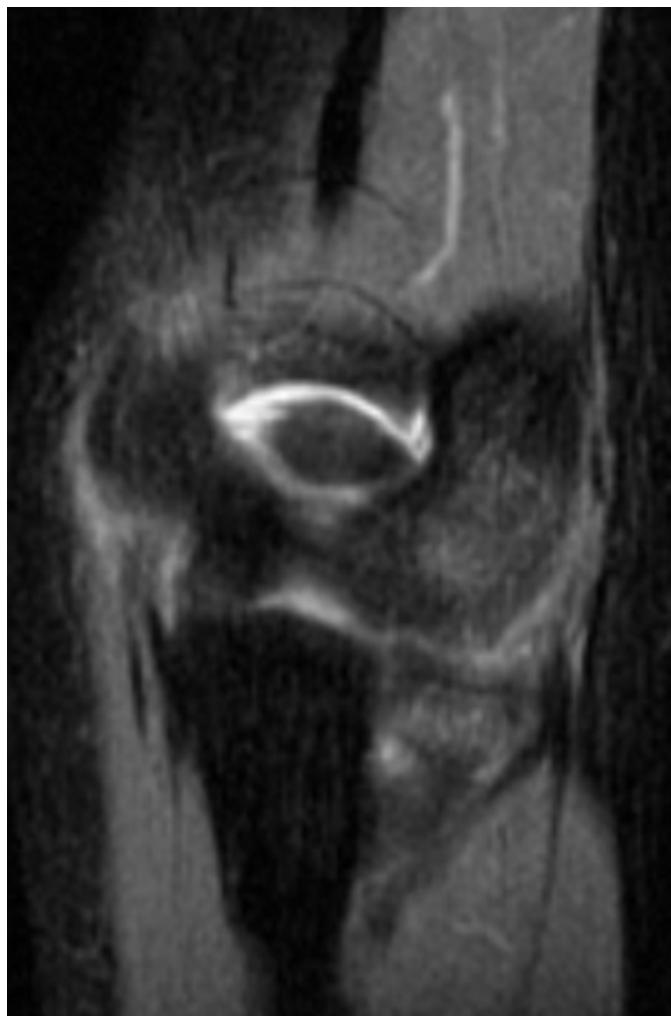


Fig 2(A). Coronal STIR MR image of the elbow shows bone marrow edema on both sides of the radio-capitellar articulation, related to chronic impingement of the fold between the radial and capitellum. The thickened synovial fold is ill-defined and increased in signal intensity.



Fig 2(A). Coronal STIR MR image with outlines depicting the bone marrow edema. The thickened synovial fold is ill-defined and increased in signal intensity.

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